

WHAT IS CLAIMED IS:

1. An optical sensor device with sensor compensation, the device comprising:
  - an optical emitter emitting an optical signal of an optical signal level according to an emitter input from an electric source;
  - an optical detector disposed to detect the optical signal and output a detector output having an output metric according to the detected optical signal, the output metric being a voltage level, a voltage drop, or a detection trigger level;
  - a variable attenuator having an adjustable attenuation setting to provide a variable sensitivity to the optical sensor device; and
  - a controller adjusting the attenuation setting of the variable attenuator during an adjustment operation to adjustably vary the variable sensitivity of the optical sensor device, determining the attenuation setting at which the output metric of the detector output exceeds a predetermined value, and accordingly setting the variable attenuator at an attenuation setting to operate the detector output with the output metric better than the predetermined value by a margin.
2. The optical sensor device according to claim 1, wherein the electric source is a voltage source.
3. The optical sensor device according to claim 1, wherein the electric source is a switched signal.
4. The optical sensor device according to claim 1, wherein the electric source is a pulse-width modulated signal, the variable attenuator includes a pulse-width modulated signal driver and the attenuation setting is a setting of the duty cycle of the pulse-width modulated signal.
5. The optical sensor device according to claim 1, wherein the variable attenuator is a pull-up resistor electrically connected between an electric source and the optical emitter to provide the emitter input, the pull-up resistor being a ladder-network resistor adjustable through a range of resistance values by step increments to vary the optical signal level.
6. The optical sensor device according to claim 1, wherein the optical detector includes an emitter lead and a collector lead, and the variable attenuator is a pull-up resistor connected between a voltage source and the collector lead, forming a variable common-emitter amplifier.

7. The optical sensor device according to claim 1, wherein the optical detector includes an emitter lead and a collector lead, and the variable attenuator is a ladder-network resistor connected between a ground and the emitter lead, forming a variable common-collector amplifier.

8. The optical sensor device according to claim 1, wherein the optical detector includes a base lead, an emitter lead and a collector lead, and the variable attenuator is a ladder-network resistor connected between the base lead and the emitter lead, forming a variable base connection.

9. The optical sensor device according to claim 1, wherein the optical sensor device is a page position sensor and the adjustment operation is a part of page position sensing operation.

10. The optical sensor device according to claim 1, wherein the optical sensor device is a color alignment sensor and the adjustment operation is a part of color alignment operation.

11. The optical sensor device according to claim 1, wherein the optical sensor device is for sensing an encoder and the adjustment operation is based on sensing the encoder.

12. The optical sensor device according to claim 1, wherein the controller is further capable of identifying an alert condition when the sensor compensation is insufficient to achieve desired sensor performance.

13. A thermal ink jet printer having the optical sensor device according to claim 1.

14. A xerographic reproduction apparatus having the optical sensor device according to claim 1.

15. A method for compensating an optical sensor due to contamination or sensed color, the optical sensor comprising an optical emitter, an optical detector, a variable attenuator having an adjustable attenuation setting, and a controller adjusting the attenuation setting, the method comprising:

operating the optical sensor by positioning and activating the optical sensor over a medium, the optical emitter being disposed to emit an optical signal towards the medium, and the optical detector being disposed to detect the optical signal from the medium and output a detector output having an output metric according to the detected optical signal, the output metric being a voltage level, a voltage drop, or a detection trigger level;

adjusting the attenuation setting of the variable attenuator through a range of attenuation values by discrete step values to vary the output metric of the detector output;

comparing the varying output metric of the detector output with a predetermined value, and determining the attenuation setting at which the output metric of the detector output exceeds the predetermined value; and

setting the attenuation of the variable attenuator to reset the output metric of the detector output at a level exceeding the predetermined value by a margin.

16. The method according to claim 15, further comprising the step of setting a fault indication to indicate that the sensor compensation is insufficient to achieve the predetermined value.

17. The method according to claim 15, wherein the variable attenuator includes a pulse-width modulated signal driver and the attenuation setting is a duty cycle setting of the pulse-width modulated signal driver.

18. The method according to claim 15, wherein the optical sensor is a page position sensor, the adjustment operation is a part of page position sensing operation, and the medium is a recording medium.

19. The method according to claim 15, wherein the optical sensor is a color alignment sensor, the adjustment operation is a part of color alignment operation, and the medium is a recording medium.

20. The method according to claim 15, wherein the optical sensor is for sensing an encoder, the adjustment operation is based on sensing the encoder, and the medium is either a linear strip or rotary disc encoder.

21. The method according to claim 15, wherein the method is used by a thermal ink jet printer and used to compensate for ink mist contamination on the optical sensor.

22. The method according to claim 15, wherein the method is used by a xerographic reproduction apparatus and used to compensate for printing contamination on the optical sensor.